

CHAPTER 9: LOWER EAST COAST REGIONAL WATER SUPPLY PLAN

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SUMMARY

An Interim Plan for the Lower East Coast (LEC) Regional Water Supply (South Florida Water Management District, March 1998) serves as the basis for addressing the future water supply needs of the region. For the environmental water demands of the Everglades ecosystem, the Interim Plan describes a process underway to establish minimum flows and levels (MFLs) for the Everglades, Lake Okeechobee and the Biscayne Aquifer. In addition, rainfall-driven water formulas are being developed to guide the operation of structural components of the Central and Southern Florida Project. At this time, MFLs have been proposed for some areas within the Everglades Protection Area (EPA). Preliminary analysis indicates that

additional regional storage capacity and water conveyance systems may be necessary to provide the additional water needed to meet the proposed criteria in certain areas.

Efforts are also underway to complete a long-term regional water supply plan that complies with recent statutory requirements. This plan will be completed in April 2000. This plan will implement the proposed MFLs by developing a Recovery and Prevention Plan, adopted by rule. The recommendations of the Central and Southern Florida (C&SF) Project Comprehensive Review Study (Restudy) will also be closely coordinated in the final LEC 2020 Plan.

INTRODUCTION

The Lower East Coast region of the South Florida Water Management District includes Lake Okeechobee and Everglades Agricultural Area (EAA), the Lake Okeechobee Service Area and the three urban Service Areas covering Miami-Dade, Broward, and Palm Beach counties; the three Water Conservation Areas (WCAs); and Everglades National Park (Park). The region encompasses the largest portion of the canals and structures of the Central and South Florida Project as shown in **Figure 1-1** in **Chapter 1**.

The LEC Plan was initiated with the goal of meeting the water supply needs of the environment, as well as urban areas and agriculture. The regional water supply system meets the needs of

urban areas and agriculture fairly well, while large portions of the Everglades and important estuaries do not receive adequate quantity, timing or distribution of water. The LEC Plan explicitly recognizes that meeting the water supply needs of the environment is a responsibility of equal importance to meeting those of urban areas and agriculture. Although the LEC Plan is not a "restoration plan," appropriate attention has been given to improving hydrologic conditions within natural systems, and particularly, within the Everglades ecosystem and Lake Okeechobee. The Plan provides a strategy to significantly improve hydropatterns within much of the Everglades system. This represents an important step forward in addressing a range of environmental problems, but full restoration of the

system is the objective of a separate multi-jurisdictional planning effort, the Restudy, covered in **Chapter 10** of this report. The final Comprehensive Plan was submitted to Congress on July 1, 1999.

In 1997, the Florida Legislature established criteria for all water management districts' water supply plans. Efforts are under way to complete a long-term regional water supply plan that complies with these requirements. The existing LEC Plan is deemed an Interim Plan until the long-term plan is completed in the year 2000. This Interim Plan identifies a program of water resource management

projects that will benefit all water users. A comprehensive list of these projects can be found in the Interim Plan for the Lower East Coast Regional Water Supply (SFWMD, March 1998).

Seven projects in the Interim Plan have been identified with direct and significant benefits to the Everglades Protection Area (EPA). This chapter begins with an overview of these implementation activities and concludes with a discussion of the advance work necessary to finalize the LEC Plan by 2000. The final LEC Plan will have a 20-year planning horizon, to 2020, and will be referred to as the LEC 2020 Plan.

INTERIM LEC PLAN

The planning process has distinguished between those alternatives that involved major modifications to the existing C&SF Project (i.e., the Restudy) and those alternatives that could be undertaken within an immediate timeframe or without federal cost-sharing. The latter group of alternatives is proposed as a LEC Interim Plan. This plan was finalized by the LEC advisory committee and approved by the District's Governing Board in March 1998.

The LEC Interim Plan proposed 34 projects with an estimated total cost of \$186 million. The District budgeted approximately \$8.1 million in fiscal year 1998 for 13 of these projects. Not all of these projects are of direct consequence to the EPA, however. A significant effort is directed at managing the future demand of urban utilities, and, in particular, finding and developing alternative sources of water supply. Aquifer storage and retrieval, wherein surplus rainfall, normally lost to tide, is pumped underground for later withdrawal, is an example.

Seven projects that are expected to produce significant benefits to the EPA are described below. The bulk of the project costs associated with these projects is absorbed as District staff cost.

MINIMUM FLOWS AND LEVELS

The establishment of MFLs is a statutory requirement. All water management districts are directed to establish minimum flows and levels for surface waters and aquifers within their jurisdictions. The District has developed a draft technical document identifying proposed minimum water level depths, duration and frequencies of occurrence that will guide the operation of the C&SF Project, and management of Lake Okeechobee, the Water Conservation Areas, Everglades National Park and the coastal Biscayne aquifer. This document is titled "Proposed Minimum Water Level Criteria for Lake Okeechobee, the Everglades, and the Biscayne Aquifer within the South Florida Water Management District" (SFWMD, July 1998). Preliminary analysis indicates that additional regional storage capacity and water conveyance systems may be necessary to provide the additional water needed to meet the proposed criteria in certain areas.

The technical document is under revision, based on comments provided by the public and an independent scientific peer review panel. A revised document was completed and presented to the Lower East Coast Regional Water Supply Plan

Advisory Committee by December 1999. An MFL Recovery and Prevention Plan will be developed subsequently as part of the LEC 2020 Plan and eventually rule development and rule-making will take place. Opportunities for public comment will be provided at public workshops throughout the South Florida region.

Several important work products will evolve from this planning process. The District will identify those areas within its boundaries that do not meet MFLs. Based on this analysis, the District will develop a MFL Recovery and Prevention strategy that includes water resource and water supply development projects designed to meet the proposed MFL. This analysis will also include an assessment of the various benefits and/or impacts that the proposed MFL may have on the environmental, urban and agricultural water use. Based on this information, the District will develop an MFL Recovery and Prevention Plan that will be incorporated into the LEC 2020 planning process.

RAINFALL-BASED WATER DELIVERY PLANS FOR WCAS AND THE PARK.

A comparison of the current managed system to the estimates of the predrained natural system indicates that the predevelopment Everglades was generally more of a flowing system with greater spatial extent, longer periods of inundation, and large interannual variation in water levels. The results of modeling suggest that the Everglades system could be operated with rainfall-driven targets triggering environmental water supply deliveries to the WCAs-2A and -3A as well as the Park. The development of rainfall-driven targets requires that statistical correlation be established between the stages at key interior gauging stations and rainfall stations upstream. Inflow volumes and rates can be adjusted structurally to mimic a more natural hydropattern at the interior gauging stations.

The Everglades Construction Project (ECP) will improve inflows to the WCAs and can be operated under a rainfall-based water delivery

plan. Modeling suggests a number of hydrologic benefits will be derived by operating the ECP under a rainfall-driven formula. The Interim Plan does not make a recommendation to implement this concept at this time. Further development of the rainfall-driven formula and additional modeling is necessary and may lead to such a recommendation in the LEC 2020 Plan.

Potential impacts on other areas and users will be assessed before implementation of rainfall-driven water delivery plans. A modification of the best management practice (BMP) replacement water rule may be necessary to implement the rainfall-based delivery plans. Coordination with development of the Park's current rainfall-based delivery plan may be necessary to better replicate natural system-like conditions on a regional scale.

RAINFALL-DRIVEN REGULATION SCHEDULE FOR THE ARTHUR R. MARSHALL LOXAHATCHEE NATIONAL WILDLIFE REFUGE (REFUGE) (WCA-1)

The U.S. Army Corps of Engineers (USACE) has recently implemented the regulation schedule for WCA-1 that was proposed by the U.S. Fish and Wildlife Service. During the next five years, this schedule will be monitored and compared to a rainfall-based formula developed by the District within this same time frame. The U.S. Fish and Wildlife Service has requested that a rainfall-based formula not be recommended until further analysis is complete; if differences are significant, modifications to the regulation schedule may be proposed that could be beneficial to the Refuge.

RAINFALL FORMULA FOR ROTENBERGER AND HOLEY LAND WILDLIFE MANAGEMENT AREAS

Modeling is necessary to evaluate whether the current operating plan for these areas approximates a more natural, rainfall-driven plan. Hydrologic and ecological performance measures are neces-

sary to analyze the benefits of adopting a rainfall-driven water delivery plan for these two wildlife management areas. Cooperation with the Florida Fish and Wildlife Conservation Commission on improvements to flow distribution, in conjunction with the ECP, will be necessary.

INCREASED CAPACITY OF G-404 PUMP STATION

The capacity of the G-404 Pump Station is limited by the USACE permit to 570 cubic feet per second (cfs) until the impacts of discharge to WCA-3A can be evaluated. Increasing the capacity of the proposed pump station G-404, beyond that proposed in the ECP, may provide the ability to deliver more water to improve hydropatterns in the northwest corner of WCA-3A. An increase from 570 to 1,000 cfs is feasible based on preliminary modeling results.

A hydraulic evaluation of the capacities of existing canals to deliver additional water to northwestern WCA-3A will be necessary. Design and construction of additional pumps and structures are estimated at \$4.6 million with completion due in late 2003. The USACE, U.S. Fish and Wildlife Service, Florida Fish and Wildlife Conservation Commission, and the District will be partners in this project. An additional analysis is under way in the Restudy and includes an examination of even greater increases in the G-404's proposed pump capacity.

LAKE OKEECHOBEE REGULATION SCHEDULE STUDY

In 1995, the USACE began the process of finding a more environmentally friendly Lake

Okeechobee regulation schedule than the current schedule (Run 25), at the request of the District, Florida Department of Environmental Protection (DEP) and the Governor's office. The ultimate goal was to determine a schedule that maintains water supply while enhancing the lake's littoral zone, South Florida estuaries and the Everglades. The District provided modeling support for this effort, comparing five alternative schedules and including actual 1990 and predicted 2010 demands on the lake. The District's modeling considered only modifications to the operational criteria for the lake. No structural modifications were considered. The study of the regulation schedule resulted in an Environmental Impact Statement from the USACE in July 1999. Anticipated implementation of changes in the schedule should occur in February 2000. The regulation schedule will serve as the basis of the final LEC Plan.

NEW STRUCTURE FOR THE C-4 CANAL

Regional-scale modeling indicates that high stages in the western C-4 Basin will raise regional groundwater levels and reduce seepage losses from eastern WCA-3B and the Park. Two control structures on the C-4 Canal, in Miami-Dade County, are proposed to avoid or reduce these conditions. The western structure, at the intersection of the Dade Broward levee and the C-4 canal, is expected to reduce seepage losses from eastern WCA-3B and Everglades National Park. This structure will be built with the USACE under the WRDA-96 critical restoration project program. Hydrogeologic and hydrologic studies have been completed and preliminary design is under way. The Project Cooperation Agreement is targeted for August 1999 and the structure is expected to be operational in late 2001.

THE FINAL LEC PLAN

In the preceding discussion and in Chapter 2, the District's effort to set MFLs for the EPA is described as a current activity under the Interim Plan. Recommendations for development of a MFL Recovery and Prevention plan, administrative rules and the operations of structures will be included in the LEC 2020 Plan to be completed in April 2000. This schedule is concurrent with congressional review and approval of the Restudy.

Criteria for allocating water from the regional system will need to be developed in the LEC 2020 Plan. Recommendations for revisions to the consumptive use permitting rules will be made in the LEC Regional Water Supply Plan in 2000, after increases in the capacity of the regional system are evaluated in light of the recent requirement to consider all projected water demands within a 20-year time horizon.

Beginning in March 1998, District staff organized a group of volunteer representatives from the regulated community to gather information on regulatory issues. These issues include: approaches to regional allocation; protection for aquifer storage and recovery facilities; criteria for long-term permit durations; criteria for resolving competing applications; revisions to wetlands protection criteria; water shortage rules; and minimum flows and levels. Amendments and additions to the permitting rules will also be based on the need to implement new technical developments concerning localized resource protection criteria such as isolated wetlands, aquifer mining, interference with existing legal users and other site-specific considerations. Other rules for managing water use competition, water conservation or other aspects of consumptive use permitting may also be proposed.

These rules must be developed in sufficient detail and included in the LEC Plan to provide water users with ample information on which to base their future water supply decisions. To receive

a water use permit based on the recommendations in the LEC Plan, water users will need information regarding the expected costs and benefits of the water supply development options. This analysis will be necessary from both regional and local perspectives.

Whether or not a specific consumptive user will benefit from a water supply development project, if implemented, can only be determined through modeling analyses. For this reason, a suite of subregional scale, groundwater models are being developed as part of the final LEC work plan. The models will be used to evaluate benefits and impacts of proposed water resource development projects on existing consumptive uses. The models will allow impacts to be assessed on a scale that will confirm the physical attributes of a withdrawal's configuration, feasibility relative to resource protection criteria and evaluation of alternatives.

Updates of existing three-dimensional, surficial aquifer models are proposed for Palm Beach, Broward and Miami-Dade counties. The completion of model development for Palm Beach, Broward, and the Dade Lakebelt is expected by late 1999. A new Caloosahatchee Basin model is online, as well as a new Floridan aquifer model. All model development is to be completed by 1999.

No revisions to the consumptive use permitting rules are recommended in the Interim LEC Plan. During the interim, a few public water supply and commercial/industrial permits are scheduled for renewal. Water supply benefits from the Interim Plan's recommended water supply and water resource development projects will be realized, however, and increased water availability will be factored into permit application review under existing rules. During the interim, District staff will recommend a duration of up to five years for consumptive use permits, which is consistent with

the basin expiration dates for irrigation-use-class permits. Applicants for consumptive use permits

are encouraged to integrate their projects into the planning analyses for the final LEC Plan.

FINDINGS ON LOWER EAST COAST WATER SUPPLY PLAN

- The Interim LEC Plan identifies seven projects with direct and significant benefits to the EPA. These improvements can proceed on a short timeframe and without federal cost sharing.
- Preliminary analysis in the development of Minimum flows and levels indicates that additional regional storage capacity and water conveyance systems may be necessary to provide the additional water needed to meet the proposed criteria in certain areas of the Everglades ecosystem.
- The Final LEC Plan will be coordinated with elements of the Comprehensive Plan for Everglades Restoration from the Restudy, and will outline approaches to regional water allocation and consumptive use permitting.